Optimal Bonus and Portfolio Strategies in Participating Life Insurance in a Stochastic Environment

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Abstract

We study the combined problem of optimizing the investment and dividend allocation strategies for a participating life insurance company in connection with a generic policy. Our framework also allows for the interpretation of the company as a pension fund with defined contribution schemes with or without minimum guarantees. The interest rate is modelled as a diffusion process generalizing the Vasicek and CIR models, leading to an affine term structure. Apart from the money market account, the company can invest in zero coupon bonds as well as several risky assets. Modelling inflation as a stochastic process, we optimize the expected utility of benefits measured in real terms and obtain explicit optimal strategies using established results from the literature where appropriate. We compare the optimal strategy with certain suboptimal strategies that are often used in practice.

Keywords: Optimization, life insurance, bonus, dividends, investment strategy, stochastic interest rate, inflation.